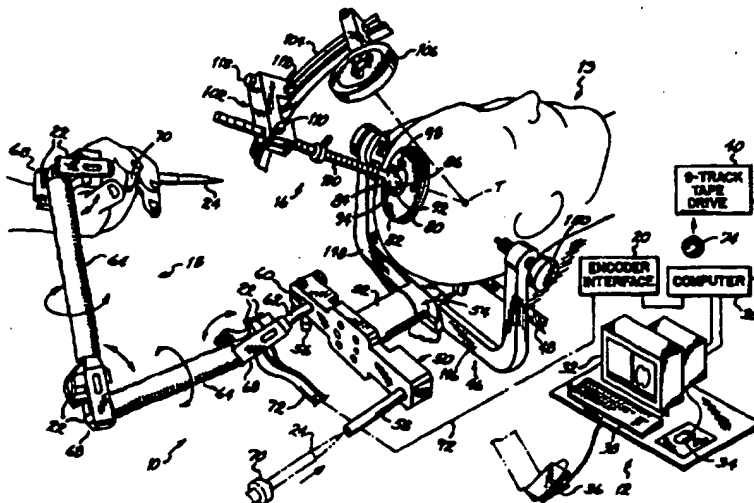




INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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(21) International Application Number: PCT/US95/12587 (22) International Filing Date: 28 September 1995 (28.09.95) (30) Priority Data: 08/315,927 30 September 1994 (30.09.94) US (71) Applicant: NOMOS CORPORATION [US/US]; 2591 Wexford Batne Road, Sewickley, PA 15143 (US). (72) Inventors: CAROL, Mark; 2591 Wexford Bayne Road, Sewickley, PA 15143 (US). DAY, James, L.; 6999 Willowdale Drive, Cincinnati, OH 45248 (US). MILLER, Erik, G.; 916 S. Aiken Street #3, Pittsburgh, PA 15232 (US). (74) Agents: EBY, C., Richard et al.; Wood, Herron & Evans, 2700 Carew Tower, Cincinnati, OH 45202 (US).		(81) Designated States: AM, AT, AU, BB, BG, BR, BY, CA, CH, CN, CZ, DE, DK, EE, ES, FI, GB, GE, HU, IS, JP, KE, KG, KP, KR, KZ, LK, LR, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, TJ, TM, TT, UA, UZ, VN, European patent (AT, BE, CH, DE, DK, ES, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, ML, MR, NE, SN, TD, TG), ARIPO patent (KE, MW, SD, SZ, UG). Published <i>With international search report.</i> (88) Date of publication of the international search report: 30 May 1996 (30.05.96)

(54) Title: APPARATUS AND METHOD FOR NEUROSURGICAL STEREOTACTIC PROCEDURES

**(57) Abstract**

An apparatus and method are disclosed for displaying a path between a selected target and selected points on a patient's skull and for guiding surgical instruments along any selected path. The system (10) is comprised of an image display system (12), an articulated arm and probe (18), and a stereotactic system (16). The sub-systems are coupled to one another so that the articulated probe (18) may be used to select patient fiducial points that correspond to selected image fiducial points. Using these points, the image display system (12) coregisters the external locations to the displayed images so that the probe condition may be displayed with the displayed images. The system (10) further permits the identification of a selected target (T) within a patient's brain and to project a path from the external position to the target prior to the performance of a craniotomy. After evaluation of the path, a surgeon may lock the stereotactic system (16) in place to preserve a selected surgical path and to guide instruments along that path. A method of utilizing the system to perform such surgical procedures is also described.

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INTERNATIONAL SEARCH REPORT

Internat Application No

PCT/US 95/12587

A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A61B19/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 A61B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US,A,5 230 623 (GUTHRIE ET AL.) 27 July 1993 see column 3, line 14 - column 4, line 9 ---	1,17,27, 28
A	WO,A,88 09151 (SCHLÖNDORFF) 1 December 1988 see claim 1 ---	1,17,27, 28
A	EP,A,0 427 358 (ALLEN ET AL.) 15 May 1991 cited in the application see claim 1 ---	1,17,27, 28
A	US,A,5 279 309 (TAYLOR ET AL.) 18 January 1994 see claim 1 ---	1,17,27, 28

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☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

15 March 1996

Date of mailing of the international search report

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
NL - 2280 HV Rijswijk
Tel. (+ 31-70) 340-2040, Tx. 31 651 epo nl,
Fax: (+ 31-70) 340-3016

Authorized officer

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INTERNATIONAL SEARCH REPORT

Internat Application No
PCT/US 95/12587

C(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>US,A,4 805 615 (CAROL) 21 February 1989 cited in the application see claim 1</p> <p>-----</p>	<p>1,17,27, 28</p>

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US 95/12587

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This international search report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.: 13-16
because they relate to subject matter not required to be searched by this Authority, namely:
Please see Rule 39.1(iv) PCT.
2. ☐ Claims Nos.:
because they relate to parts of the international application that do not comply with the prescribed requirements to such an extent that no meaningful international search can be carried out, specifically:
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

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2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this international search report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this international search report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internal Application No

PCT/US 95/12587

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